ORIGINAL ARTICLE

Peripheral Nerve Injuries Presenting to a Tertiary Care Hospital an Experience with 40 Patients

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ABSTRACT

Objective: *To study the different aspects of peripheral nerve injury presenting to a tertiary care hospital.*

Material and Methods: *This descriptive study was conducted in Neurosurgery Department of PGMI, Lady Reading Hospital Peshawar from June 2009 to June 2011. A total number of 40 patients were studied through randomized sampling technique. The study included patients of all age groups and both gender. All patients who presented at the time of injury and up to duration of 9 months since time of injury were included in the study. Patients with injection injury and traction injury were excluded. All the data was collected by using a Proforma. Data was analyzed by descriptive statistics using SPSS software version 17.*

Results: *Majority of the patients were male, 36 (90%) and 4 (10%) were female. Gunshot injury was the commonest cause 23 (57.5%). The commonest affected age group was 20 – 30 years (37.5%). Children below 10 years and people above 60 years of age were least affected. Peripheral nerve injuries due to Bomb blasts were 4 (10%) followed by Glass injuries. Iatrogenic nerve injury in orthopaedic and general surgical procedures was in 3(7.5%) patients. Injuries with sharp weapons such as knife and stabs were seen in 4 (10%) patients. Two patients were having concomitant vascular injury. Patients with sharp injuries had excellent results while patients in whome the cause was fire arm injury the results were not much promising. All the patients were followed up for maximum period of more than 1.5 years.*

Conclusion: *Majority of our patients were male. Major etiological factor was firearm and bomb blast injuries in our study. Furthermore, patients with sharp injuries had excellent results.*

Key Words: *Peripheral nerve injury, Etiological factor, Gunshot injury, Blast injury.*

INTRODUCTION

Peripheral nerve injuries are not an uncommon cause of disability. Young people usually fall victims to peripheral nerve injuries. Functional recovery after a peripheral nerve injury (PNI) is often poor. If timely treated they can be saved from this disability. When a peripheral nerve is disrupted, a type of degeneration occurs at the distal end which is called **wallerian degeneration**. However unlike the central axons peripheral axons have the ability to **grow at speed of 1mm per day** and to direct themselves to a motor or sensory terminal. Surgery for peripheral nerves is based on this simple principle. Wallerian degeneration is cleansing process that prepares the distal stump for innervation[1]. If the two cut ends are coapted in time the patient can have a useful function in limb.

In our society firearm and knife injuries are the commonest cause of nerve injuries. In women injuries with glass and other sharp domestic objects like scissors are the common causes. Recently due to wave of violence, Bomb blast injuries have added to the spectrum of causes of nerve injuries in our province. Peripheral nerve transection without surgical repair lead to permanent motor and sensory loss in the affected area.[2]

Till 1914 there was no concept of the surgical

treatment of peripheral nerve injuries[3]. World War I and World War II gave an opportunity to gain invaluable experience in terms of classification of nerve injuries and surgical intervention. The use of **nerve conduction study**, **electromyography** and currently the use of **high frequency ultrasound** has helped a lot in the diagnosis and accurate localization of peripheral nerve injuries.[4,5]

The techniques of nerve repairs have been further refined with use of Microscope and a variety of different techniques such as perineurial repair, group fascicular repair, nerve grafting, side to side neurorrhaphy, end to side neurorrhaphy, nerve transfer and neurotization are done.[6-8] Nerve conduits and decellularized allografts have been tried for improved functional outcome in peripheral nerve injuries.[9] As peripheral nerve injuries are not properly looked after, so we conducted this study to know the different etiological factors and outcome of surgery in different types of nerve injuries.

MATERIALS AND METHODS

We studied 40 cases of peripheral nerve injuries in Neurosurgery unit post graduate medical institute Lady Reading Hospital Peshawar. The duration of this study was from June 2009 to June 2011. In this study we included patients of all age groups irrespective of gender and those who presented at the time of injury and up to duration of 9 months since time of injury. While, patients with injection injury and traction injury were excluded from the study. The history and examination of all these patients were recorded.

Electrophysiological studies such as **nerve conduction study** and **EMG** were done in all these patients after 3 weeks of injury while observing them for physiological recovery. The patient whose follow up clinical examination and EMG and nerve conduction study showed no **signs of improvement after 3 months**, were prepared for surgery after optimization. The nerve injuries of all these patients were surgically proven. These patients were then followed up in the Out patients department for maximum period of 1.5 years.

RESULTS

Sex Incidence

Out of total number of 40 patients of peripheral nerve injury, 36 (90%) were male and 4 (10%) were female (Table 1).

Table 1: *Sex Incidence.*

Sex	No.	Percentage
Male	36	90%
Female	4	10%
Total	40	100%

Age Incidence

The commonest affected age group was 20-30 years (37.5%). The second common affected age group was 10 – 20 years (20%). Children below 10 years and people above 60 years of age were least affected (Table 2).

Table 2: *Age wise distribution of patients.*

S. No.	Age	# of Patient	Percentage
1.	Up to 10 Years	2	5%
2.	10 – 20 years	8	20%
3.	20 – 30 years	15	37.5%
4.	30 – 40 Years	7	17.5%
5.	40 – 50 Years	4	10
6.	50 – 60 Years	2	5%
7.	60 – 70 Years	2	5%
	Total	40	100%

Table 3: *Nature of injury in 40 patients with peripheral nerve injuries.*

S. No.	Type of Injury	No. of Patients	Percentage
1.	Knife injury	4	10%
2.	Bomb blast injury	4	10%
3.	Gunshot injury	23	57.5%
4.	Iatrogenic injury's	3	7.5%
5.	Glass Injury	6	15%
	Total	40	100%

Operative Procedure

We did end to end coaptation in 30 patients. Nerve grafting was done in one case. In 5 patients nerve continuity was not disrupted but the nerve was adhered in

the surrounding tissue. The nerve was released of adhesions. In 4 patients neuroma in continuity was found but there was no conduction across the neuroma. The neuroma was excised and the cut ends were coapted. The limbs were kept in flexed position in those patients in whom tension on nerves were feared (Table 5).

Table 4: *Nerve injured.*

Nerve injured	No. of Patients	Percentage
Ulnar nerve	8	20%
Median nerve	6	15%
Sciatic nerve	6	15%
Radial nerve	6	15%
Common peroneal nerve	6	15%
Tibial nerve	3	7.5%
Brachial plexus injury	5	12.5
Total	40	100%

Table 5: *Surgical Procedures.*

Surgical Procedure	Number	Percentage
End to end anastomosis	30	66.5%
Nerve graft	1	2.5%
Release of adhesions	5	11%
Excision of Neuroma and end to end anascomosy	4	10%

Outcome

The results were excellent in patients with sharp injury and in those patients in which the site of injury was distally located. Patients with fire arm injury and those with more proximal injury, the results were not very good. Patients with ulnar and median nerve injury in whom the site of injury was near the wrist had good functional recovery.

DISCUSSION

The invasion of Afghanistan by foreign troops has increased the intensity and rate of violence in our province. Firearm and physical assaults with knives and other sharp objects are the commonest modes of violence. Bomb blasts have added to other methods of violence. In our study 57.5%patients of peripheral nerve injury were due to gun shot injury and 10% patients were due to bomb blasts. This shows the magnitude of violence and war like situation in our province. Road traffic accidents are another cause of peripheral nerve injuries. One study shows 2 – 3% of level 1 trauma patients having peripheral nerve injuries.[10] Another study shows 1.5 to2.8% incidence of peripheral nerve injury in extremity trauma.[11,12] Due to ignorance and lack of proper neurosurgical facilities patients with peripheral nerve did not receive proper care initially. Awareness and development of new techniques has added enormously to the care of these patients.

Seddon classified nerve injuries injuries in 1943 into **neuropraxia**, **axontomesis**, and **neurontemesis**. Sunderland in 1951 further expanded this classification in to five grades. He further divided Seddon, category of **neurontemesis** into **grade 3, 4, 5** based on the extent of damage to **axonal supporting structure**. In **Grade 3** injuries axon continuity is disrupted by loss of **endoneurial tubes** but the perineuriam is protected. In these injuries fasciculi are damaged but sheath continuity is maintained, when axon regenerate intraneurial scarring occurs. In **grade 4** injuries the **perineuriam and endoneuriam** both are damaged but the epineuriam is preserved. In **grade 5** injuries the **endoneuriam, perineuriam and epineuriam** are completely divided. Sunderland grade 5 injuries corresponds to Seddon's classification of **neurontemesis**.[13] This classification is useful in deciding whether to treat these patients conservatively or surgically. We did **end to end coaptation in 30** patients. Nerve grafting was done in one case. In 5 patients nerve continuity was not disrupted but the nerve was adhered in the surrounding tissue. The nerve was released of adhesions. In 4 patients neuroma in continuity was found but there was no conduction across the neuroma. The neuroma was excised and the cut ends were coapted. The limbs were kept in flexed position in those patients in whom tension on nerves were feared (Table 5).

In our study firearm injury was the commonest (57.5%) cause of nerve injury while another study shows injury with sharp objects to be the commonest (61%) cause of nerve injuries[10]. The reason behind this fact is that in our region the firearm injuries are so frequent. Ulnar nerve was the commonest (20%) nerve injured in our study. This corresponds to other studies which show ulnar nerve to be the commonest nerve involoved.[10,14] Another study shows brachial plexus as

the commonest site of injury.[15] The reason might be this that road traffic accidents are common in industrialized countries, and in road traffic accidents the brachial plexus is more vulnerable to traction / injury.

There was concomitant vascular injury in two cases in our study. In one case brachial artery was involved in the other radial artery was involved. Brachial artery laceration was found in 3 cases in another study.[16] The vessels are lying in close proximity to nerves and are prone to trauma in peripheral nerve injuries. Furthermore, doppler ultrasound is advisable to exclude vascular injury before embarking on surgery.

CONCLUSION

We conclude from this study that major bulk of our patients was young males. The commonest cause factor was firearm and bomb blast injuries in our study. Furthermore, patients with sharp injuries had excellent results, while the results in patients with firearm injuries and with more proximal injuries are not so promising.

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